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ORIGINAL ARTICLE

Waiting Times for Elective Orthopaedic Surgeries in a Teaching Hospital and Their Influencing Factors

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ABSTRAK

Masa menunggu yang lama bagi pembedahan elektif merupakan satu tanda aras perkhidmatan yang tidak efisien. Satu kajian irisan lintang masa menunggu pembedahan elektif ortopedik dan faktor-faktor yang mempengaruhinya telah dijalankan di sebuah hospital universiti dari Januari 2003 hingga Jun 2004 dengan menggunakan rekod-rekod 'case mix' yang selesai dikodkan. Hasil kajian utama yang diukur adalah masa menunggu untuk pembedahan elektif dari tarikh temu janji di klinik pakar sehingga tarikh pembedahan (T1) dan masa menunggu dari tarikh pembedahan diberikan sehingga tarikh pembedahan sebenar berlangsung (T2). Median masa menunggu T1 ialah selama 23 minggu (5.75 bulan) dan 5.86 minggu (1.47 bulan) bagi T2. Ujian Khi Kuasa Dua untuk T1 adalah bagi faktor umur dan ko-morbiditi tetapi faktor bangsa hanya bagi T2. Walaubagaimanapun, Ujian Logistik Regresi Berganda mendapati faktor pembayaran pesakit melalui pihak ketiga dengan nilai (OR) 1.97 (95%CI:1.05-3.72) adalah bererti lebih berkemungkinan menunggu lama berbanding pesakit yang membayar sendiri. Bagi T2, wanita dengan nilai (OR) 2.29 (95%CI: 1.19-4.42), India dengan nilai (OR) 2.50 (95%CI: 1.16-5.38) dan bekerja sendiri dengan nilai (OR) 4.28 (95%CI: 1.23-14.97) adalah beerti lebih berkemungkinan mempunyai masa menunggu yang singkat. Oleh itu, faktor penentu bagi keseluruhan masa menunggu ialah umur, ko-morbiditi, bangsa, pekerjaan dan cara pembayaran perkhidmatan oleh pesakit.

Kata kunci: pembedahan elektif ortopedik, masa menunggu

ABSTRACT

Long waiting time for elective operations is a usable key performance index of inefficiency in services. A cross-sectional study for orthopedic elective surgery waiting times and their influencing factors was done in a teaching hospital, from January 2003 to June 2004; using case-mix patient's coded records. Main outcomes measured were length of waiting time from first seen at the specialist clinic until surgery (T1) and length of waiting time from the time date of surgery was given until surgery (T2). The median waiting time for T1 was 23 weeks (5.75 months) and 5.86 weeks (1.47 months) for T2. Chi square test was significant for T1 which includes age, comorbidity but only

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ethnicity was significant for T2. However, multiple logistic regression showed patients paid by third party (OR) of 1.97 (95%CI:1.05-3.72) were significantly likely to wait longer than those who paid out of their own pocket. For T2, women (OR) of 2.29 (95%CI: 1.19-4.42), Indian (OR) of 2.50 (95%CI: 1.16-5.38) and who are self employed (OR) of 4.28 (95%CI: 1.23-14.97) were significantly more likely to have shorter waiting time. Thus predictors for overall waiting time are age, comorbidity, ethnicity, occupation and the method of paying for services rendered by the patients.

Key words: orthopedic elective surgery, waiting times.

INTRODUCTION

Long waiting time for elective operations has been used as a key performance index of inefficiency of hospital services (Buhaug, 2002). Waiting for treatment may have advance consequences on the natural history of the disease. The longer the wait, the higher the possibility of health impairment, the lower the probability of full recovery (Jofre-Bonet, 2000). These include worsening symptoms and deteriorating quality of life resulting in substantial limitation of activities (Derret et al. 1999). The chances of returning to work after surgery may strongly be influenced by the length of time on the waiting list (Rossvoll et al. 1993).

Factors related to waiting times vary depending on hospitals and individual surgeons within hospitals (Cregan, 2005). Hospital services can either be a tax financed public treatment provider with a fixed quality or a private provider with a range of different qualities. Consumer's covariates such as income, socio-demographic characteristics and health status, and the quality of treatment provided by the public system may influence the decision on timing of surgery (Jofre-Bonet, 2000). The reasons for elective surgery cancellations (Cregan 2005) include lack of theatre time, lack of postoperative beds, cancellation by patient or carer, patient clinic change and procedural reasons.

The decision to be on a waiting list is determined by individual surgeons, using no common criteria (Derret et al. 1999). In general, the waiting time from orthopedic consultation to surgery appears unrelated to the level of urgency (Conner-Spady et al. 2005). There is no reliable means of assessing the relative priority of patients on waiting lists. It is also impossible to manage waiting lists rationally to ensure that patients with the highest urgency are served first (Noseworthy et al. 2002).

Studies related to waiting times for elective surgery varied in terms of patient setting, main objectives and methodology. This study tries to assess the waiting times for elective surgery in a teaching hospital and to identify factors influencing the waiting times. These include patient factors (age, gender, occupational status and ethnicity); disease factors (severity and co-morbidity) and temporal factors affecting services. We hope to give recommendations on managing waiting times for elective surgery in teaching hospitals, based on the findings from this study.

MATERIALS AND METHODS

A cross-sectional study of waiting times to surgery was undertaken by using data

obtained from patient's records coded according to case-mix system based on the International Refined Diagnosis Related Group (IR-DRG). Sample size of two proportions (independent observations), required a total of 366 records (183 per group). Due to limitation of case notes coded according to case-mix, only 267 records (70% power) of elective cases in a teaching hospital are collected for analysis. The study was approved by the Research and Ethics Committee of the hospital.

Two dependent variables: T1 and T2 are measured. T1 represents waiting time from the time patient was first seen at the specialist clinic until surgery is done. Waiting times are converted into binary data based on the median waiting times of less than and 6 months or more as short waits and long waits respectively (Mahon et al. 2002; Lofvendahl et al. 2005). T2 represents waiting time from the decision date for surgery to the actual surgery. Based on the studies done by DeCoster et al (1999) and Conner-Spady et al (2005), waiting times are also converted into binary data using the median waiting time of less than and one month or more as short waits and long waits respectively. The independent variables are patient factors (age, gender, occupational status and ethnicity); disease factors (severity and co-morbidity) and temporal factors affecting services.

Hospital records information included date placed in the operation book, total cost for the treatment and surgery, and total cost borne by the patient. Data was analysed using Statistical Package for Social Sciences (SPSS) version 11.0. The Chi-square test was used for associations between categorical variables and the Mann-Whitney U test to determine whether there is any significant difference between total cost for treatment and surgery, and total cost borne by the patient with T1 and T2 waiting time. Logistic regression was performed to see any association between both waiting time and the independent variables.

RESULTS

This study showed that the median waiting times for T1 and T2 were 23 weeks (5.75 months) and 5.86 weeks (1.47 months) respectively (Table 1).

With regards to the temporal factors, there is no obvious trend seen in the distribution of cases between January 2003 till June 2004 (Figure 1). The mean hospital stay is 7.91±4.85 days.

The significant factors associated with T1 waiting time were age and co-morbidity but only ethnicity was significantly associated with T2 (Table 2 and Table 3). Table 4 and 5 showed results of the Mann-Whitney U-test of waiting times with the total cost of the treatment and cost borne by patients. The median total cost of treatment was RM815.00 (interquartile range of RM1486.75) and the median cost borne by patients was RM40.50 (interquartile range of RM474.00).

There was no significant difference between waiting time T1 and cost borne by patient (p=0.12), and with total cost of treatment (p=0.08). There was also no significant difference between the waiting time T2 and cost borne by patients (p=0.93), and also with the total cost of treatment (p=0.25).

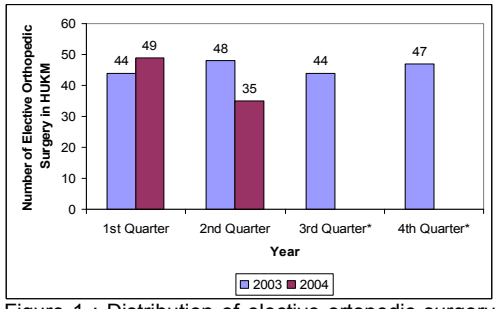

Figure 1 : Distribution of elective ortopedic surgery according to quarters of the year (study period between Jan 2003-June 2004)*

However, multiple logistic regression showed that patients who were paid by a third party, (OR) of 1.97 (95% CI:1.05-3.72) were significantly more likely to wait longer than those who paid out of pocket for the surgery (Table 6). Nevertheless, for T2, women, (OR) of 2.29 (95% CI: 1.19-4.42), Indian, (OR) of 2.50 (95%CI: 1.16-5.38) and those who are self-employed (OR) of 4.28 (95%CI: 1.23-14.97) were all significantly more likely to have shorter waiting time (Table 7).

Table 1 : Categories of Waiting Time, T1 and T2 (weeks)

Weeks	Mean	SD	Median	Inter-quartile range	Minimum	Maximum
T1	38.6	53.1	23.0	41.3	0.3	401.7
T2	7.4	6.6	5.9	9.0	0.1	40.1

T1 - Waiting time from the first consultation until surgery is done
T2 - Waiting time from the first decision date for surgery to the actual surgery

Table 2: Distribution of sociodemographic and health status variables (T1).

Variables	Waiting time T1		*p value**
	<24 weeks [n (%)]	≥24 weeks [n (%)]	
Gender			
Male	79(54.9%)	65(45.1%)	0.623
Female	63(51.2%)	60(48.7%)	
Age category			
<25	33(38.8%)	52 (61.2%)	0.005**
25 - 55	58(58.0%)	42(42.0%)	
>55	51(62.2%)	31(37.8%)	
Ethnic group			
Malay	73(50.3%)	72(49.7%)	0.492
Chinese	43(54.4%)	36(45.6%)	
Indian	26(60.5%)	17(39.5%)	
Occupation			
Government	13(52.0%)	12(48.0%)	0.176
Private	30(57.7%)	22(42.3%)	
Self-employed	11(61.1%)	7(38.9%)	
Student	29(40.8%)	42(59.2%)	
Unemployed	59(58.4%)	42(41.6%)	
Severity of disease			
One	114(52.5%)	103(47.5%)	0.509
Two	22(52.4%)	20(47.6%)	
Three	6(75.0%)	2(25.0%)	
Co-morbidity			
Without co-morbidity	33(42.3%)	45(57.7%)	0.042**
1 and 2 co-morbidity	77(55.4%)	62(44.6%)	
≥ 3 co-morbidity	32(64.0%)	17(36.0%)	
Method of payment			
Out of own pocket	67(60.4%)	44(39.6%)	0.062
Third party	75(48.1%)	81(51.9%)	

* Chi-square test (Exact test)
** significant p<0.05

Table 3: Distribution of sociodemographic and health status variables (T2)

Variables	Waiting time T1 <4 weeks n (%)	Waiting time T1 ≥4 weeks n (%)	*p value**
Gender			
Male	45(31.3%)	99(68.7%)	0.074
Female	52(42.3%)	71(57.7%)	
Age category			
<25	24(28.2%)	61(71.8%)	0.106
25 - 55	37(37.0%)	63(63.0%)	
>55	36(43.9%)	46(56.1%)	
Ethnic group			
Malay	48(33.1%)	97(66.9%)	0.043**
Chinese	26(32.9%)	53(67.1%)	
Indian	23(53.5%)	20(46.5%)	
Occupation			
Government	8(32.0%)	17(68.0%)	0.181
Private	16(30.8%)	36(69.2%)	
Self-employed	10(55.6%)	8(44.4%)	
Student	21(29.6%)	50(70.4%)	
Unemployed	42(41.6%)	59(58.4%)	
Severity of disease			
One	75(34.6%)	142(65.4%)	0.460
Two	19(45.2%)	23(54.8%)	
Three	3(37.5%)	5(62.5%)	
Co-morbidity			
Without co-morbidity	26(33.3%)	52(66.7%)	0.293
1 and 2 co-morbidity	48(34.5%)	91(65.5%)	
≥ 3 co-morbidity	23(46.0%)	27(54.0%)	
Method of payment			
Out of own pocket	45(40.5%)	66(59.5%)	0.247
Third party	52(33.3%)	104(66.7%)	

* Chi-square test (Exact test)
** significant p<0.05

Table 4: The result of Mann-Whitney Test for waiting time T1 and treatment cost

Treatment Cost (RM) n=267		Waiting Time T1 < 24 Weeks n=142	Waiting Time T1 ≥24 Weeks n=125	*p value**
Cost borne by patient	Mean	RM 357.59	RM 529.19	
	SD	RM 713.58	RM 1050.17	p=0.12
	Median	RM 33.75	RM 54.00	
Total cost	Mean	RM 1111.28	RM 1448.74	
	SD	RM 1026.16	RM 1384.68	p=0.08
	Median	RM697.25	RM 1098.00	

(*Mann-Whitney Test: significant p<0.05)

DISCUSSION

In the present study, the median waiting time for T1 and T2 were 23 weeks (5.75 months) and 5.86 weeks (1.47 months) respectively. The finding for T1 was similar to the study done by Conner-Spady et al. (2005) in Canada with the median waiting time of 21.07 weeks and by Fielden et al. (2005) in New Zealand with a median of 5.1 months for arthroplasty. However, there are not many studies done to determine the waiting time for T2, because there is no field in the administrative data to indicate when each patient and surgeon made the decision to proceed with surgery, and hence, it is difficult to get the time when the date of surgery was given to the patient (DeCoster et al. 1999; Derret et al. 1999). The median waiting time for hip replacement was 5.6 months, 2.1 months for spine surgery and 1.8 months for athroscopic knee surgery (Lofvendahl et al. 2005). The discrepancies seen here are due to other complexities in determining the 'trigger point' to the waiting list.

Age factor and ethnicity have largely been neglected by previous studies. In this series, age factor and patient co-morbidity significantly influence the waiting time T1 and ethnicity has significantly attribute to T2. This was supported by DeCoster et al (1999) whereby, the waiting time for older patients were shorter because they were likely to be retired and readily available on short notice for surgery. Age was a significant predictor of maximum acceptable waiting time with older patients preferring shorter maximum acceptable waiting time (Conner-Spady et al. 2005). As for ethnicity, according to Hacker et al (2004), there were no studies examining ethnicity and waiting times. According to Shwartz et al (1996), the presence of co-morbidities

Table 5: The result of Mann-Whitney test of waiting time T2 and treatment cost

Treatment Cost (RM) n=267		Waiting Time T1 < 24 Weeks n=142	Waiting Time T1 ≥24 Weeks n=125	*p value**
Cost borne by patient	Mean	RM 335.18	RM 496.55	p=0.93
	SD	RM 611.80	RM 1011.67	
	Median	RM 50.00	RM 39.00	
Total cost	Mean	RM 1054.02	RM 1392.09	p=0.25
	SD	RM 916.41	RM 1345.86	
	Median	RM 699.50	RM 964.00	

(*Mann-Whitney Test: significant p<0.05)

Table 6: Results of Multiple Logistic Regression for T1

Variables	(B)	*p value*	Exp (B)	95% CI
Age	-0.01	0.28	0.99	0.96-1.01
Co-morbidity	-0.158	0.11	0.85	0.7-1.02
Method of Payment: Out of own pocket: Third party	0.68	0.04*	1.97	1.05-3.72
Constant	0.59	0.47	1.80	

** significant if p<0.05*

Table 7: Results of Multiple Logistic Regression for T2

Variables	(B)	*p value*	Exp (B)	95% CI
Gender:				
Male (reference)				
Female	0.83	0.03*	2.29	1.19-4.42
Ethnic:				
Malay (reference)				
Chinese	-0.26	0.47	0.77	0.39-1.55
Indian	0.92	0.019*	2.50	1.16-5.38
Occupation:				
Unemployed (reference)				
Government	0.32	0.59	1.37	0.44-4.33
Private	0.44	0.42	1.55	0.54-4.41
Self-employed	1.45	0.023*	4.28	1.23-14.97
Student	0.32	0.61	0.61	0.40-4.77
Method of Payment:				
Out of own pocket (reference)				
Third party	-0.37	0.28	0.69	0.35-1.35
Constant	-1.66	0.05	0.19	

**significant if p<0.05*

was an important determinant of costs because it increase the total burden.

Based on multiple logistic regression for T1, patients who were paid by a third party were significantly more likely to wait longer than those who paid out of their own pocket. This may be due to processing delay in application for claims related to admission and surgery; restriction due to limited coverage by the policy or patient's coverage is already at the maximum limit. Dowling (1997) noted that fund-holding patients in United Kingdom have shorter waiting times for surgery than non-fund holding patients. This may be because fund-holding practices are funded over generously.

For T2, women, Indian patients and those who are self-employed were likely to have a shorter waiting time. Females were less likely to be referred and frequently need urgent surgery (Hacker et al. 2004). Working patients had significantly shorter waiting times than non-working patients (Lofvendahl et al. 2005). This is due to the fact that by receiving surgical treatment more quickly, they would be subject to fewer interruptions at work (DeCoster et al. 1999).

This study is not without limitations. Administrative data always lack clinical information. The study's generalization is also questionable as this study was done in a teaching hospital with a case-mix system in place. Finally, the interpretation of the results is limited by the absence of information on other variables that might have an impact on the waiting times.

CONCLUSION

The results indicate that the predictors of waiting time are age, comorbidity, ethnicity, occupation and the method of paying for services rendered by the patients. Another important factor for time spent on waiting list was hospital type, whereby a possible explanation for longer waiting time in a teaching hospital could be that elective surgery is frequently delayed due to emergency cases (Lofvendahl et al. 2005).

In non-life-threatening conditions, in which there is insufficient evidence on

the long-term effects of waiting times on clinical outcomes, patient, physician and public input to decision making is critical to a fair process for establishing standards for acceptable waiting times for scheduled procedures. Attention should be focused on the role of hospital-related factors: scheduling admissions, evaluation of priority strategies, allocation of operating theatres, capacity planning for intensive care units, bed capacity analysis, planning, blood bank management, and the use of quality of life instruments in the future studies. Future research should also include study of maximum acceptable waiting times (Conner-Spady et al.2005) as it relates to ideal waiting time, patient information, perceived equity, past experience with waiting, and patient satisfaction. For an acceptable service, a better method in prioritizing length of waiting time according to symptomatic experience is required.

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